Compilation of existing literature data on the standard and routine metabolic rate of Atlantic salmon (*Salmo salar*)

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COMPILATION OF EXISTING LITERATURE DATA ON THE STANDARD AND ROUTINE METABOLIC RATE OF ATLANTIC SALMON (*SALMO SALAR*)

by

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ABSTRACT

Enders, E.C. and Scruton, D.A. 2005. Compilation of existing literature data on the standard and routine metabolic rate of Atlantic salmon (*Salmo salar*). Can. Data Rep. Fish. Aquat. Sci. 1176: v + 43p.

This data report compiles information on the standard and routine metabolic rate of Atlantic salmon (*Salmo salar* L.) in relation to body mass, water temperature and salinity. A total of 790 standard metabolic rates and 116 routine metabolic rates were obtained. Very few studies were conducted on wild fish. Most data were obtained for juvenile life stages. Only a few metabolic rates were found for adult Atlantic salmon. Consequently, further studies will be needed on the standard metabolic rate of adult Atlantic salmon under marine and freshwater conditions.

RÉSUMÉ

Enders, E.C. and Scruton, D.A. 2005. Compilation of existing literature data on the standard and routine metabolic rate of Atlantic salmon (*Salmo salar*). Can. Data Rep. Fish. Aquat. Sci. 1176: v + 43p.

Ce rapport illustre des données portant sur les taux métaboliques standard et les taux métaboliques de routine du saumon atlantique (*Salmo salar* L.) en relation avec la masse, la température et la salinité de l'eau. En totalité, 790 taux métabolique standard ainsi que 116 taux métaboliques de routine provenant d'études portant sur le métabolisme du saumon atlantique ont été obtenus. Parmi ces études, seulement quelques unes portaient sur les saumons sauvages. Les données ont majoritairement été obtenues avec des juvéniles du saumon atlantique. Peu de taux métabolique ont été trouvés pour le stade adulte du saumon atlantique. Conséquemment, il est nécessaire d'initier davantage d'études portant sur le taux métabolique standard des adultes du saumon atlantique évoluant en milieu marin et d'eau douce.

INTRODUCTION

Atlantic salmon supports significant recreational and native fisheries as well as being an important species for the aquaculture industry. Over the past 200 years, dams, industrial pollution, and commercial overfishing combined have led to a severe decrease of wild Atlantic salmon populations, especially at the southern edge of the natural distribution (Parrish et al. 1998). Today, Atlantic salmon populations in many European and North American rivers are considered as endangered or extinct (Bardonnet and Baglinière 2000; COSEWIC 2004). Protection and management of Atlantic salmon habitat for rearing, spawning, and migration is thought to be one of the key factors to Atlantic salmon conservation (Armstrong et al. 2003). Fish habitat models are applied to describe and predict effects of anthropogenic perturbations on habitat quality (Bovee 1982). Bioenergetics models may be implemented in fish habitat models to assess the expected net energy gain in order to describe habitat quality (Fausch 1984). However, the accuracy of the predictions generated by bioenergetics model relies strongly on appropriate input variables such as the standard metabolic rate (Ney 1993).

Numerous studies have been conducted on the standard metabolic rate of Atlantic salmon. However, most data are presented in the form of tables and figures that are not 'user-friendly' for fisheries or aquaculture managers, and no standard metabolic rate model is available to predict standard metabolic rates over a wide range of environmental conditions. This lack of a comprehensive standard metabolic rate model leads to the extrapolation from closely related species. For example, the models of Liao (1971), developed for Pacific salmon have been used to estimate the standard metabolic rate of Atlantic salmon (Bergheim et al. 1991). Recently, a broad comparison of metabolic rate models by Trudel et al. (2004) has demonstrated that standard metabolic rate models derived from even closely related species may not accurately predict the metabolic rates of Pacific salmon. Thus, the authors suggest that the practice of 'species borrowing' should be avoided in assessing metabolic rates (Trudel et al. 2004).

The aim of the present data report was threefold: (1) to compile data on the standard metabolic rate of Atlantic salmon to ultimately develop a comprehensive standard metabolic rate model; (2) to compile data on the standard metabolic rate of Atlantic salmon for use in developing a comprehensive model; and (3) to indentify available data and gaps of information to priorize future research.

MATERIALS AND METHODS

Standard metabolic rate R_s of Atlantic salmon was taken out of published tables or extracted from published figures with the help of a digitizer board (SummaSketch®III Professional, SummaGraphics Corporation, Lansdale, PA, USA). If necessary, obtained data on metabolic rate was converted to mg $O_2 \cdot h^{-1}$ and body mass in g. Furthermore, the experimental approach (closed system respirometer, flow-through respirometer, intermittent flow respirometer, or calorimetry), the life stage (fry, parr, smolt, or adult), the

origin of fish (wild, first generation hatchery of wild genitors, domesticated, or growth enhanced transgenic), body mass (in g), water temperature (in °C) and salinity used during the experiments were documented. When spontaneous activity occurred during the experimental procedure, metabolic rate was classified as routine metabolic rate after Fry (1957).

RESULTS

A total of 906 metabolic rates were extracted from the literature. Most estimates were derived using an indirect respirometry approach by measuring the oxygen consumption of the fish. Only one study used a direct calorimetry approach measuring the heat production of fish (Smith et al. 1978). From the extracted metabolic rates, 87.2% were classified as standard metabolic rate and 12.8% as routine metabolic rate, including energy cost related to spontaneous activity or swimming.

Metabolic rates obtained from the literature covered all life stages of Atlantic salmon. For fry, 137 metabolic rates were obtained (15.0%; Table 1 and 2). There were 524 estimates reported for parr (57.8%; Table 3 and 4), followed by 226 estimates for smolt (24.9%; Table 5). Only 19 estimates were obtained for adult Atlantic salmon (2.1%; Table 6).

Fish used in the experiments came from four different sources. Most were obtained from hatchery reared fish (91.3%). Only 2.2% of the estimates were obtained for wild fish. Domesticated fish that originated from the Norwegian National Breeding Program at Sunndalsøra (Aquagen, Norway) were used in 1.5% of the estimates (Table 7). The Sunndalsøra salmon were developed for the Norwegian fish farm industry and have been bred selectively since 1971 to attain certain characteristics such as increased growth, delayed maturity, and disease resistance. The first-generation fish were derived from 40 different wild salmon populations. However, after four generations, the stock was dominated by individuals coming from only one to three populations characterized by fast-growing and late-maturing fish (Gjedrem et al. 1991). In two studies growth enhanced transgenic salmon were used (3.9% of the extracted metabolic rates; Table 8). These fish are created by incorporating a gene construct that encodes the growth hormone leading to enhanced growth of these fish (Devlin et al. 2001).

Overall, metabolic rates over a wide range of body sizes (0.1-8,849.5 g), water temperatures (1.0-24.0°C) and salinity (0-35) were extracted (Table 9). In contrast, only a limited number of metabolic rates were found for adult Atlantic salmon. Consequently, the application of a metabolic rate model with the limited input data on the adult phase of Atlantic salmon may necessitate extrapolation of metabolic rates outside the range of body mass and environmental conditions used for the model development. Thus, it may be necessary to obtain additional estimates on standard metabolic rate of adult Atlantic salmon in order to extend ranges of environmental conditions and/or to fill in gaps of the existing dataset.

Bioenergetics models have high potential to quantify consumption, growth and activity rates of fish (Kitchell et al. 1977) and may be applied for aquaculture management and habitat conservation and restoration. Reliable predictions of bioenergetics model depend, among other variables, on appropriated metabolic rates (Ney 1993). Data compiled in this report will help to develop comprehensive metabolic rate models over a range of environmental conditions.

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Table 1. Standard metabolic rate (R_s in $mg \cdot h^{-1}$) for Atlantic salmon fry of given fish origin, at given experimental approach and feeding regime, and in relation to body mass (M in g), water temperature (T in °C), and salinity (S).

Publication	Origin	Experimental setup	Feeding	M (g)	T (°C)	S	R_S ($mg \cdot h^{-1}$)
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	1.0	9.0	0	0.08
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	1.5	9.0	0	0.28
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	1.5	9.0	0	0.27
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	1.5	9.0	0	0.23
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	1.6	9.0	0	0.26
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	1.6	9.0	0	0.54
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	1.7	9.0	0	0.25
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	1.8	9.0	0	0.35
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	2.1	9.0	0	0.38
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	2.1	9.0	0	0.50
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	2.2	9.0	0	0.52
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	2.3	9.0	0	0.43
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	2.4	9.0	0	0.41
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	2.5	9.0	0	0.50
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	2.5	9.0	0	0.67
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	2.7	9.0	0	0.49
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	2.7	9.0	0	0.64
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	2.8	9.0	0	1.18
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	2.8	9.0	0	0.41
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	2.8	9.0	0	0.73
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	2.8	9.0	0	0.51
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	2.9	9.0	0	0.76
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	2.9	9.0	0	0.50
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	3.0	9.0	0	0.88
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	3.1	9.0	0	0.66
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	3.2	9.0	0	0.62
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	3.3	9.0	0	0.73
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	3.3	9.0	0	0.97
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	3.4	9.0	0	0.44
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	3.4	9.0	0	0.75
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	3.4	9.0	0	0.54
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	3.5	9.0	0	0.59
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	3.5	9.0	0	0.70
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	3.6	9.0	0	0.68
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	3.7	9.0	0	0.47
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	3.7	9.0	0	0.90
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	3.8	9.0	0	0.56
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	3.8	9.0	0	0.59

Table 1 (Cont'd.)

Publication	Origin	Experimental setup	Feeding	M (g)	T (°C)	S	R_S ($mg \cdot h^{-1}$)
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	3.9	9.0	0	0.88
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	3.9	9.0	0	0.66
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	4.1	9.0	0	0.55
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	4.1	9.0	0	0.57
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	4.1	9.0	0	0.81
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	4.3	9.0	0	0.65
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	4.4	9.0	0	0.89
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	4.4	9.0	0	0.63
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	4.7	9.0	0	0.78
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	4.7	9.0	0	0.80
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	4.8	9.0	0	0.47
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	5.0	9.0	0	0.99
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	5.0	9.0	0	0.58
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	5.1	9.0	0	0.91
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	5.3	9.0	0	1.15
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	5.4	9.0	0	0.53
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	5.6	9.0	0	1.37
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	5.9	9.0	0	0.72
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	6.2	9.0	0	1.22
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	6.2	9.0	0	0.62
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	6.2	9.0	0	0.79
Cutts et al. (2002)	hatchery	flow-through	unfed, 20 h	7.6	9.0	0	1.10
Dabrowski (1986)	NA	closed system	unfed, 24 h	0.1	22.0	0	0.06
Metcalfe et al. (1995)	hatchery	flow-through	unfed, 15-20 h	0.1	11.7	0	0.01
Metcalfe et al. (1995)	hatchery	flow-through	unfed, 15-20 h	0.3	11.7	0	0.12
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	1.3	9.5	0	0.22
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	1.7	9.5	0	0.21
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	1.8	9.5	0	0.21
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	1.9	9.5	0	0.32
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	2.0	9.5	0	0.27
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	2.0	9.5	0	0.20
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	2.0	9.5	0	0.26
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	2.1	9.5	0	0.17
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	2.1	9.5	0	0.28
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	2.1	9.5	0	0.18
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	2.1	9.5	0	0.21
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	2.2	9.5	0	0.30
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	2.2	9.5	0	0.25
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	2.2	9.5	0	0.30
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	2.2	9.5	0	0.23
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	2.3	9.5	0	0.34
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	2.3	9.5	0	0.25

Table 1 (Cont'd.)

Publication	Origin	Experimental setup	Feeding	M (g)	T (°C)	S	R_S ($mg \cdot h^{-1}$)
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	2.4	9.5	0	0.49
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	2.4	9.5	0	0.25
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	2.4	9.5	0	0.34
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	2.4	9.5	0	0.35
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	2.4	9.5	0	0.57
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	2.6	9.5	0	0.24
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	2.6	9.5	0	0.20
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	2.7	9.5	0	0.30
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	2.7	9.5	0	0.42
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	2.7	9.5	0	0.26
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	2.7	9.5	0	0.30
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	2.7	9.5	0	0.18
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	2.8	9.5	0	0.20
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	2.8	9.5	0	0.32
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	3.0	9.5	0	0.41
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	3.0	9.5	0	0.43
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	3.0	9.5	0	0.22
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	3.0	9.5	0	0.22
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	3.0	9.5	0	0.28
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	3.0	9.5	0	0.26
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	3.1	9.5	0	0.33
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	3.1	9.5	0	0.27
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	3.1	9.5	0	0.33
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	3.1	9.5	0	0.32
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	3.1	9.5	0	0.51
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	3.1	9.5	0	0.30
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	3.2	9.5	0	0.23
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	3.3	9.5	0	0.49
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	3.4	9.5	0	0.38
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	3.6	9.5	0	0.55
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	3.7	9.5	0	0.66
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	3.7	9.5	0	0.44
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	3.7	9.5	0	0.45
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	3.7	9.5	0	0.46
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	3.7	9.5	0	0.37
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	3.8	9.5	0	0.29
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	3.8	9.5	0	0.35
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	4.3	9.5	0	0.37
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	4.3	9.5	0	0.30
O'Connor et al. (2000)	hatchery	flow-through	unfed, 16-24 h	4.3	9.5	0	0.26
Smith et al. (1978)	hatchery	calorimeter	unfed, 24 h	1.4	3.0	0	0.02
Smith et al. (1978)	hatchery	calorimeter	unfed, 24 h	1.4	6.0	0	0.01

Table 1 (Cont'd.)

Publication	Origin	Experimental setup	Feeding	M (g)	T (°C)	S	R_S ($mg \cdot h^{-1}$)
Smith et al. (1978)	hatchery	calorimeter	unfed, 24 h	1.4	10.0	0	0.03
Smith et al. (1978)	hatchery	calorimeter	unfed, 24 h	1.4	12.0	0	0.06
Smith et al. (1978)	hatchery	calorimeter	unfed, 24 h	1.4	15.0	0	0.02
Smith et al. (1978)	hatchery	calorimeter	unfed, 24 h	1.4	18.0	0	0.01

Note: NA: not available.

Table 2. Routine metabolic rate (R_R in $mg \cdot h^{-1}$) for Atlantic salmon fry of given fish origin, at given experimental approach and feeding regime, and in relation to body mass (M in g), water temperature (T in °C), and salinity (S).

Publication	Origin	Experimental setup	Feeding	M (g)	T (°C)	S	R_R ($mg \cdot h^{-1}$)
Dabrowski (1986)	NA	closed system	unfed, 24 h	0.1	22.0	0	0.04
Dabrowski (1986)	NA	closed system	unfed, 24 h	0.1	22.0	0	0.07
Dabrowski (1986)	NA	closed system	unfed, 24 h	0.1	22.0	0	0.07
Dabrowski (1986)	NA	closed system	unfed, 24 h	0.1	22.0	0	0.05
Dabrowski (1986)	NA	closed system	unfed, 24 h	0.1	22.0	0	0.06
Dabrowski (1986)	NA	closed system	unfed, 24 h	0.1	22.0	0	0.08
Dabrowski (1986)	NA	closed system	unfed, 24 h	0.1	22.0	0	0.09
Dabrowski (1986)	NA	closed system	unfed, 24 h	0.1	22.0	0	0.11
Privolnev (1953) in Winberg (1960)	wild	NA	NA	1.5	15.0	0	0.72
Winberg (1960)	wild	NA	NA	0.2	14.5	0	0.13
Winberg (1960)	wild	NA	NA	2.5	14.5	0	1.30

Note: NA: not available.

Table 3. Standard metabolic rate (R_s in $mg \cdot h^{-1}$) for Atlantic salmon parr of given fish origin, at given experimental approach and feeding regime, and in relation to body mass (M in g), water temperature (T in °C), and salinity (S).

Publication	Origin	Experimental setup	Feeding	M (g)	T (°C)	S	R_s ($mg \cdot h^{-1}$)
Baraduc and Fontaine (1955)	wild	NA	NA	38	7.4-8.3	0	2.77
Finstad et al. (2004)	hatchery	closed system	unfed, 48 h	16.1	1.0	0	0.34
Finstad et al. (2004)	hatchery	closed system	unfed, 48 h	16.1	1.0	0	0.43
Finstad et al. (2004)	hatchery	closed system	unfed, 48 h	17.1	1.0	0	0.35
Finstad et al. (2004)	hatchery	closed system	unfed, 48 h	17.1	1.0	0	0.56
Finstad et al. (2004)	hatchery	closed system	unfed, 48 h	18.6	1.0	0	0.36
Finstad et al. (2004)	hatchery	closed system	unfed, 48 h	18.6	1.0	0	0.49
Herbert et al. (2001)	hatchery	intermittent flow	unfed, 24 h	9.2	14.0	0	1.14
Higgins (1985)	hatchery	flow-through	unfed, 48 h	3.5	7.5	0	0.04
Higgins (1985)	hatchery	flow-through	unfed, 48 h	3.5	7.5	0	0.04
Higgins (1985)	hatchery	flow-through	unfed, 48 h	3.3	7.5	0	0.06
Higgins (1985)	hatchery	flow-through	unfed, 48 h	3.4	7.5	0	0.06
Higgins (1985)	hatchery	flow-through	unfed, 48 h	5.6	7.5	0	0.06
Higgins (1985)	hatchery	flow-through	unfed, 48 h	5.6	7.5	0	0.07
Higgins (1985)	hatchery	flow-through	unfed, 48 h	2.1	7.5	0	0.09
Higgins (1985)	hatchery	flow-through	unfed, 48 h	2.1	7.5	0	0.09
Higgins (1985)	hatchery	flow-through	unfed, 48 h	1.9	7.5	0	0.09
Higgins (1985)	hatchery	flow-through	unfed, 48 h	2.0	7.5	0	0.09
Higgins (1985)	hatchery	flow-through	unfed, 48 h	3.2	7.5	0	0.10
Higgins (1985)	hatchery	flow-through	unfed, 48 h	3.1	7.5	0	0.10
Higgins (1985)	hatchery	flow-through	unfed, 48 h	3.2	7.5	0	0.10
Higgins (1985)	hatchery	flow-through	unfed, 48 h	5.8	7.5	0	0.11
Higgins (1985)	hatchery	flow-through	unfed, 48 h	3.1	7.5	0	0.11
Higgins (1985)	hatchery	flow-through	unfed, 48 h	5.9	7.5	0	0.11
Higgins (1985)	hatchery	flow-through	unfed, 48 h	2.9	7.5	0	0.11

Table 3 (Cont'd.)

Publication	Origin	Experimental setup	Feeding	M (g)	T (°C)	S	R_S ($mg \cdot h^{-1}$)
Higgins (1985)	hatchery	flow-through	unfed, 48 h	2.9	7.5	0	0.12
Higgins (1985)	hatchery	flow-through	unfed, 48 h	3.4	7.5	0	0.13
Higgins (1985)	hatchery	flow-through	unfed, 48 h	3.4	7.5	0	0.13
Higgins (1985)	hatchery	flow-through	unfed, 48 h	3.4	7.5	0	0.14
Higgins (1985)	hatchery	flow-through	unfed, 48 h	2.9	7.5	0	0.14
Higgins (1985)	hatchery	flow-through	unfed, 48 h	3.4	7.5	0	0.14
Higgins (1985)	hatchery	flow-through	unfed, 48 h	2.9	7.5	0	0.14
Higgins (1985)	hatchery	flow-through	unfed, 48 h	3.4	7.5	0	0.14
Higgins (1985)	hatchery	flow-through	unfed, 48 h	2.9	7.5	0	0.14
Higgins (1985)	hatchery	flow-through	unfed, 48 h	2.8	7.5	0	0.15
Higgins (1985)	hatchery	flow-through	unfed, 48 h	3.5	7.5	0	0.15
Higgins (1985)	hatchery	flow-through	unfed, 48 h	2.8	7.5	0	0.15
Higgins (1985)	hatchery	flow-through	unfed, 48 h	5.1	7.5	0	0.15
Higgins (1985)	hatchery	flow-through	unfed, 48 h	2.8	7.5	0	0.15
Higgins (1985)	hatchery	flow-through	unfed, 48 h	7.1	7.5	0	0.15
Higgins (1985)	hatchery	flow-through	unfed, 48 h	5.1	7.5	0	0.15
Higgins (1985)	hatchery	flow-through	unfed, 48 h	5.6	7.5	0	0.16
Higgins (1985)	hatchery	flow-through	unfed, 48 h	5.5	7.5	0	0.16
Higgins (1985)	hatchery	flow-through	unfed, 48 h	6.3	7.5	0	0.18
Higgins (1985)	hatchery	flow-through	unfed, 48 h	6.4	7.5	0	0.18
Higgins (1985)	hatchery	flow-through	unfed, 48 h	6.6	7.5	0	0.18
Higgins (1985)	hatchery	flow-through	unfed, 48 h	6.6	7.5	0	0.18
Higgins (1985)	hatchery	flow-through	unfed, 48 h	8.8	7.5	0	0.21
Higgins (1985)	hatchery	flow-through	unfed, 48 h	4.9	7.5	0	0.21
Higgins (1985)	hatchery	flow-through	unfed, 48 h	4.9	7.5	0	0.21
Higgins (1985)	hatchery	flow-through	unfed, 48 h	7.2	7.5	0	0.21
Higgins (1985)	hatchery	flow-through	unfed, 48 h	2.8	7.5	0	0.22
Higgins (1985)	hatchery	flow-through	unfed, 48 h	13.3	7.5	0	0.22
Higgins (1985)	hatchery	flow-through	unfed, 48 h	2.8	7.5	0	0.22

Table 3 (Cont'd.)

Publication	Origin	Experimental setup	Feeding	M (g)	T (°C)	S	R_S ($mg \cdot h^{-1}$)
Higgins (1985)	hatchery	flow-through	unfed, 48 h	9.6	7.5	0	0.22
Higgins (1985)	hatchery	flow-through	unfed, 48 h	7.6	7.5	0	0.22
Higgins (1985)	hatchery	flow-through	unfed, 48 h	8.4	7.5	0	0.22
Higgins (1985)	hatchery	flow-through	unfed, 48 h	8.2	7.5	0	0.24
Higgins (1985)	hatchery	flow-through	unfed, 48 h	7.1	7.5	0	0.25
Higgins (1985)	hatchery	flow-through	unfed, 48 h	8.0	7.5	0	0.26
Higgins (1985)	hatchery	flow-through	unfed, 48 h	5.4	7.5	0	0.26
Higgins (1985)	hatchery	flow-through	unfed, 48 h	5.4	7.5	0	0.27
Higgins (1985)	hatchery	flow-through	unfed, 48 h	7.1	7.5	0	0.28
Higgins (1985)	hatchery	flow-through	unfed, 48 h	8.2	7.5	0	0.28
Higgins (1985)	hatchery	flow-through	unfed, 48 h	9.1	7.5	0	0.29
Higgins (1985)	hatchery	flow-through	unfed, 48 h	11.7	7.5	0	0.29
Higgins (1985)	hatchery	flow-through	unfed, 48 h	6.0	7.5	0	0.29
Higgins (1985)	hatchery	flow-through	unfed, 48 h	7.0	7.5	0	0.29
Higgins (1985)	hatchery	flow-through	unfed, 48 h	6.0	7.5	0	0.30
Higgins (1985)	hatchery	flow-through	unfed, 48 h	9.3	7.5	0	0.31
Higgins (1985)	hatchery	flow-through	unfed, 48 h	7.0	7.5	0	0.32
Higgins (1985)	hatchery	flow-through	unfed, 48 h	19.1	7.5	0	0.32
Higgins (1985)	hatchery	flow-through	unfed, 48 h	8.5	7.5	0	0.33
Higgins (1985)	hatchery	flow-through	unfed, 48 h	8.7	7.5	0	0.33
Higgins (1985)	hatchery	flow-through	unfed, 48 h	12.9	7.5	0	0.35
Higgins (1985)	hatchery	flow-through	unfed, 48 h	9.0	7.5	0	0.35
Higgins (1985)	hatchery	flow-through	unfed, 48 h	7.1	7.5	0	0.35
Higgins (1985)	hatchery	flow-through	unfed, 48 h	4.6	7.5	0	0.36
Higgins (1985)	hatchery	flow-through	unfed, 48 h	4.6	7.5	0	0.36
Higgins (1985)	hatchery	flow-through	unfed, 48 h	9.3	7.5	0	0.39
Higgins (1985)	hatchery	flow-through	unfed, 48 h	10.9	7.5	0	0.39
Higgins (1985)	hatchery	flow-through	unfed, 48 h	16.1	7.5	0	0.43

Table 3 (Cont'd.)

Publication	Origin	Experimental setup	Feeding	M (g)	T (°C)	S	R_S ($mg \cdot h^{-1}$)
Higgins (1985)	hatchery	flow-through	unfed, 48 h	10.0	7.5	0	0.44
Higgins (1985)	hatchery	flow-through	unfed, 48 h	10.1	7.5	0	0.45
Higgins (1985)	hatchery	flow-through	unfed, 48 h	9.2	7.5	0	0.48
Higgins (1985)	hatchery	flow-through	unfed, 48 h	11.0	7.5	0	0.48
Higgins (1985)	hatchery	flow-through	unfed, 48 h	19.3	7.5	0	0.49
Higgins (1985)	hatchery	flow-through	unfed, 48 h	17.4	7.5	0	0.54
Higgins (1985)	hatchery	flow-through	unfed, 48 h	9.4	7.5	0	0.55
Higgins (1985)	hatchery	flow-through	unfed, 48 h	13.1	7.5	0	0.56
Higgins (1985)	hatchery	flow-through	unfed, 48 h	13.8	7.5	0	0.78
Higgins (1985)	hatchery	flow-through	unfed, 48 h	18.3	7.5	0	0.79
Higgins (1985)	hatchery	flow-through	unfed, 48 h	18.7	7.5	0	0.84
Higgins (1985)	hatchery	flow-through	unfed, 48 h	13.6	7.5	0	0.88
Higgins (1985)	hatchery	flow-through	unfed, 48 h	30.3	7.5	0	0.94
Higgins (1985)	hatchery	flow-through	unfed, 48 h	28.2	7.5	0	1.04
Higgins (1985)	hatchery	flow-through	unfed, 48 h	28.0	7.5	0	1.72
Higgins (1985)	hatchery	flow-through	unfed, 48 h	26.5	7.5	0	1.80
Higgins (1985)	hatchery	flow-through	unfed, 48 h	43.4	7.5	0	2.57
Higgins (1985)	hatchery	flow-through	unfed, 48 h	67.5	7.5	0	2.85
Higgins (1985)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	2.48
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	2.90
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	5.43
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	5.48
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	5.49
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	5.50
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	5.53
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	5.54
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	5.54
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	5.58

Table 3 (Cont'd.)

Publication	Origin	Experimental setup	Feeding	M (g)	T (°C)	S	R_S ($mg \cdot h^{-1}$)
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	5.59
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	5.60
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	5.60
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	5.64
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	5.64
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	5.65
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	5.65
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	5.65
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	5.67
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	5.70
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	5.75
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	5.76
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	5.76
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	5.77
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	5.77
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	5.79
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	5.80
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	5.80
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	5.81
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	5.82
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	5.84
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	5.89
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	5.91
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	5.95
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	5.95
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	5.95
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	5.95
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	5.96

Table 3 (Cont'd.)

Publication	Origin	Experimental setup	Feeding	M (g)	T (°C)	S	R_S ($mg \cdot h^{-1}$)
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	5.99
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	6.02
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	6.03
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	6.05
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	6.06
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	6.08
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	6.10
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	6.12
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	6.13
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	6.13
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	6.16
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	6.20
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	6.22
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	6.24
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	6.24
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	6.25
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	6.27
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	6.27
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	6.28
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	6.30
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	6.30
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	6.31
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	6.32
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	6.37
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	6.38
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	6.38
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	6.41
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	6.43

Table 3 (Cont'd.)

Publication	Origin	Experimental setup	Feeding	M (g)	T (°C)	S	R_S ($mg \cdot h^{-1}$)
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	6.43
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	6.43
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	11.1	0	6.46
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	6.53
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	6.66
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	6.91
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	6.91
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	7.01
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	7.07
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	7.20
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	7.31
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	7.32
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	7.32
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	7.36
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	7.37
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	7.37
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	7.43
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	7.43
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	7.44
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	7.51
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	7.56
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	7.58
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	7.61
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	7.62
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	7.62
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	7.66
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	7.68
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	7.68
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	7.68

Table 3 (Cont'd.)

Publication	Origin	Experimental setup	Feeding	M (g)	T (°C)	S	R_S ($mg \cdot h^{-1}$)
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	7.72
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	7.72
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	7.72
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	7.77
Maxime (2002)	hatchery	flow-through	unfed, 48 h	34.6	10.8	SW	7.83
Maxime et al. (1989)	hatchery	flow-through	unfed, 48 h	4.9	8.4	0	0.38
Maxime et al. (1989)	hatchery	flow-through	unfed, 48 h	7.3	12.5	0	0.86
Maxime et al. (1989)	hatchery	flow-through	unfed, 48 h	11.5	14.7	0	1.40
Maxime et al. (1989)	hatchery	flow-through	unfed, 48 h	26.6	18.6	0	2.89
Peterson and Anderson (1969)	hatchery	closed system	unfed	25.0	6.0	0	1.45
Peterson and Anderson (1969)	hatchery	closed system	unfed	25.0	9.0	0	1.96
Peterson and Anderson (1969)	hatchery	closed system	unfed	25.0	6.0	0	2.04
Peterson and Anderson (1969)	hatchery	closed system	unfed	25.0	12.0	0	2.15
Peterson and Anderson (1969)	hatchery	closed system	unfed	25.0	9.0	0	2.18
Peterson and Anderson (1969)	hatchery	closed system	unfed	25.0	12.0	0	3.17
Peterson and Anderson (1969)	hatchery	closed system	unfed	25.0	15.0	0	3.52
Peterson and Anderson (1969)	hatchery	closed system	unfed	25.0	15.0	0	4.92
Peterson and Anderson (1969)	hatchery	closed system	unfed	25.0	18.0	0	5.27
Peterson and Anderson (1969)	hatchery	closed system	unfed	25.0	18.0	0	5.65
Peterson and Anderson (1969)	hatchery	closed system	unfed	25.0	21.0	0	5.78
Peterson and Anderson (1969)	hatchery	closed system	unfed	25.0	21.0	0	5.86
Peterson and Anderson (1969)	hatchery	closed system	unfed, 36 h	25.0	24.0	0	9.07
Power (1959)	wild	flow-through	unfed, 18 h	42.5	10.0	0	0.003
Power (1959)	wild	flow-through	unfed, 18 h	59.0	12.7	0	0.01
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	1.05
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	1.07
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	1.07
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	1.08
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	1.08

Table 3 (Cont'd.)

Publication	Origin	Experimental setup	Feeding	M (g)	T (°C)	S	R_S ($mg \cdot h^{-1}$)
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	1.08
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	1.09
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	1.09
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	1.10
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	1.10
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	1.10
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	1.10
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	1.10
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	1.10
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	1.10
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	1.11
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	1.11
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	1.11
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	1.12
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	1.14
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	1.15
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	1.17
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	1.19
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	1.20
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	1.21
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	1.51
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	1.52
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	1.57
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	1.58
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	1.60
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	1.66
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	1.77
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	1.78
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	1.81

Table 3 (Cont'd.)

Publication	Origin	Experimental setup	Feeding	M (g)	T (°C)	S	R_S ($mg \cdot h^{-1}$)
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	1.81
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	1.82
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	1.83
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	1.91
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	1.92
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	1.97
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	1.98
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	2.01
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	2.03
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	2.08
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	2.11
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	2.11
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	2.13
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	2.13
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	2.13
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	2.15
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	2.16
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	2.17
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	2.19
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	2.20
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	2.20
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	2.20
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	2.21
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	2.21
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	2.21
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	2.22
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	2.22
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	2.26
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	2.27

Table 3 (Cont'd.)

Publication	Origin	Experimental setup	Feeding	M (g)	T (°C)	S	R_S ($mg \cdot h^{-1}$)
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	2.28
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	2.29
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	2.32
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	2.32
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	2.32
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	2.33
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	2.33
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	2.33
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	2.35
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	SW	2.36
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	2.36
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	2.38
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	2.38
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	2.41
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	2.43
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	2.47
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	2.47
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	2.50
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	2.52
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	2.52
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	2.57
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	2.57
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	2.60
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	2.61
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	2.61
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	2.62
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	2.62
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	2.62
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	2.63

Table 3 (Cont'd.)

Publication	Origin	Experimental setup	Feeding	M (g)	T (°C)	S	R_S ($mg \cdot h^{-1}$)
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	2.63
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	2.67
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	2.67
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	2.68
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	2.68
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	2.69
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	2.69
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	2.69
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	2.71
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	2.72
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	2.72
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	2.73
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	2.73
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	2.73
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	2.73
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	2.76
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	2.77
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	2.80
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	2.84
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	2.84
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	2.85
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	2.86
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	2.88
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	2.88
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	2.88
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	2.89
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	2.90
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	2.92
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	2.92

Table 3 (Cont'd.)

Publication	Origin	Experimental setup	Feeding	M (g)	T (°C)	S	R_S ($mg \cdot h^{-1}$)
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	2.93
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	2.93
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	2.94
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	2.94
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	2.95
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	2.96
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	2.96
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	2.96
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	2.97
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	2.97
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	2.98
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	2.99
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	3.01
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	3.02
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	3.02
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	3.03
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	3.03
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	3.03
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	3.06
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	3.06
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	3.06
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	3.07
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	3.09
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	3.10
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	3.10
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	3.13
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	3.14
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	3.15
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	3.16

Table 3 (Cont'd.)

Publication	Origin	Experimental setup	Feeding	M (g)	T (°C)	S	R_S ($mg \cdot h^{-1}$)
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	3.18
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	3.20
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	3.21
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	3.22
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	3.22
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	3.24
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	3.25
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	3.25
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	3.26
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	3.28
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	3.30
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	3.31
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	3.31
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	3.32
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	3.33
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	3.33
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	3.34
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	3.35
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	3.35
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	3.37
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	0	3.39
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	3.42
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	3.42
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	3.45
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	3.48
Seddiki et al. (1996)	hatchery	flow-through	NA	35.0	12.0	SW	3.49
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	3.57
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	3.65
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	3.70

Table 3 (Cont'd.)

Publication	Origin	Experimental setup	Feeding	M (g)	T (°C)	S	R_S ($mg \cdot h^{-1}$)
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	3.73
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	3.80
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	3.82
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	3.84
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	4.00
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	4.21
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	4.39
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	4.48
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	4.60
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	4.62
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	4.72
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	4.82
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	4.91
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	5.01
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	5.06
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	5.09
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	5.18
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	5.22
Seddiki et al. (1996)	hatchery	flow-through	NA	16.0	12.0	0	5.29
Stevens et al. (1998)	hatchery	flow-through	unfed, 12 h	10.5	12.5	4	1.45
Wright et al. (2001)	hatchery	intermittent flow	unfed, 72 h	3.3	5.0	0	0.22
Wright et al. (2001)	hatchery	intermittent flow	unfed, 72 h	3.1	5.0	0	0.30
Wright et al. (2001)	hatchery	intermittent flow	unfed, 72 h	4.5	5.0	0	0.31
Wright et al. (2001)	hatchery	intermittent flow	unfed, 72 h	3.4	5.0	0	0.34
Wright et al. (2001)	hatchery	intermittent flow	unfed, 72 h	4.2	5.0	0	0.38
Wright et al. (2001)	hatchery	intermittent flow	unfed, 72 h	5.6	5.0	0	0.41
Wright et al. (2001)	hatchery	intermittent flow	unfed, 72 h	3.4	5.0	0	0.42
Wright et al. (2001)	hatchery	intermittent flow	unfed, 72 h	7.6	5.0	0	0.61
Wright et al. (2001)	hatchery	intermittent flow	unfed, 72 h	3.3	10.0	0	0.64

Table 3 (Cont'd.)

Publication	Origin	Experimental setup	Feeding	M (g)	T (°C)	S	R_S ($mg \cdot h^{-1}$)
Wright et al. (2001)	hatchery	intermittent flow	unfed, 72 h	3.1	10.0	0	0.67
Wright et al. (2001)	hatchery	intermittent flow	unfed, 72 h	3.4	10.0	0	0.72
Wright et al. (2001)	hatchery	intermittent flow	unfed, 72 h	4.2	10.0	0	0.76
Wright et al. (2001)	hatchery	intermittent flow	unfed, 72 h	4.5	10.0	0	0.87
Wright et al. (2001)	hatchery	intermittent flow	unfed, 72 h	3.4	10.0	0	0.87
Wright et al. (2001)	hatchery	intermittent flow	unfed, 72 h	5.6	10.0	0	0.89
Wright et al. (2001)	hatchery	intermittent flow	unfed, 72 h	7.5	10.0	0	1.24

Note: NA: not available; SW: seawater, salinity not specified.

Table 4. Routine metabolic rate (R_R in $mg \cdot h^{-1}$) for Atlantic salmon parr of given fish origin, at given experimental approach and feeding regime, and in relation to body mass (M in g), water temperature (T in °C), and salinity (S).

Publication	Origin	Experimental setup	Feeding	M (g)	T (°C)	S	R_R ($mg \cdot h^{-1}$)
Cook et al. (2000)	hatchery	flow-through	unfed, 24 h	14.0	13.0	0	2.36
Cook et al. (2000)	hatchery	flow-through	unfed, 24 h	52.0	13.0	0	7.19
Privolnev (1953)	wild	NA	NA	5.0	15.0	0	1.53
Privolnev (1953)	wild	NA	NA	5.0	15.0	0	2.00
Privolnev (1953)	wild	NA	NA	10.0	15.0	0	2.50
Stevens et al. (1998)	hatchery	flow-through	fed	29.0	12.5	4	6.37
Stevens et al. (1998)	hatchery	flow-through	fed	29.0	12.5	4	7.92
Stevens et al. (1998)	hatchery	flow-through	fed	29.0	12.5	4	7.95
Stevens et al. (1998)	hatchery	flow-through	fed	29.0	12.5	4	8.98
Stevens et al. (1998)	hatchery	flow-through	fed	29.0	12.5	4	8.88
Stevens et al. (1998)	hatchery	flow-through	fed	29.0	12.5	4	8.93
Stevens et al. (1998)	hatchery	flow-through	fed	29.0	12.5	4	8.81
Stevens et al. (1998)	hatchery	flow-through	fed	29.0	12.5	4	9.51
Stevens et al. (1998)	hatchery	flow-through	fed	29.0	12.5	4	9.38
Stevens et al. (1998)	hatchery	flow-through	fed	29.0	12.5	4	9.87
Stevens et al. (1998)	hatchery	flow-through	fed	29.0	12.5	4	9.96
Stevens et al. (1998)	hatchery	flow-through	fed	29.0	12.5	4	9.67
Stevens et al. (1998)	hatchery	flow-through	fed	29.0	12.5	4	9.68
Stevens et al. (1998)	hatchery	flow-through	fed	29.0	12.5	4	8.48
Stevens et al. (1998)	hatchery	flow-through	fed	29.0	12.5	4	8.52
Stevens et al. (1998)	hatchery	flow-through	fed	29.0	12.5	4	7.77
Stevens et al. (1998)	hatchery	flow-through	fed	29.0	12.5	4	7.74
Stevens et al. (1998)	hatchery	flow-through	fed	29.0	12.5	4	8.18
Stevens et al. (1998)	hatchery	flow-through	fed	29.0	12.5	4	8.20
Stevens et al. (1998)	hatchery	flow-through	fed	29.0	12.5	4	8.60

Table 4 (Cont'd.)

Publication	Origin	Experimental setup	Feeding	M (g)	T (°C)	S	R_R ($mg \cdot h^{-1}$)
Stevens et al. (1998)	hatchery	flow-through	fed	29.0	12.5	4	8.62
Stevens et al. (1998)	hatchery	flow-through	fed	29.0	12.5	4	9.26
Stevens et al. (1998)	hatchery	flow-through	fed	29.0	12.5	4	9.31
Stevens et al. (1998)	hatchery	flow-through	fed	29.0	12.5	4	10.05
Stevens et al. (1998)	hatchery	flow-through	fed	29.0	12.5	4	10.10
Stevens et al. (1998)	hatchery	flow-through	unfed, 12 h	49.8	12.5	4	8.46
Wiggs et al. (1989)	hatchery	closed system	unfed, 48 h	35.0	14.0	0	4.89
Wiggs et al. (1989)	hatchery	closed system	unfed, 48 h	35.0	14.0	0	4.63
Wiggs et al. (1989)	hatchery	closed system	unfed, 48 h	35.0	14.0	0	6.11
Wiggs et al. (1989)	hatchery	closed system	unfed, 48 h	35.0	14.0	0	6.32
Wiggs et al. (1989)	hatchery	closed system	unfed, 48 h	35.0	14.0	0	7.00
Wiggs et al. (1989)	hatchery	closed system	unfed, 48 h	35.0	14.0	0	5.82
Wiggs et al. (1989)	hatchery	closed system	unfed, 48 h	35.0	14.0	0	7.59
Wiggs et al. (1989)	hatchery	closed system	unfed, 48 h	35.0	14.0	0	7.20
Wiggs et al. (1989)	hatchery	closed system	unfed, 48 h	35.0	14.0	0	7.18
Wiggs et al. (1989)	hatchery	closed system	unfed, 48 h	35.0	14.0	0	7.03
Wiggs et al. (1989)	hatchery	closed system	unfed, 48 h	35.0	14.0	0	8.25
Wiggs et al. (1989)	hatchery	closed system	unfed, 48 h	35.0	14.0	0	8.22
Wiggs et al. (1989)	hatchery	closed system	unfed, 48 h	35.0	14.0	0	7.87
Wiggs et al. (1989)	hatchery	closed system	unfed, 48 h	35.0	14.0	0	7.43
Wiggs et al. (1989)	hatchery	closed system	unfed, 48 h	35.0	14.0	0	8.31
Winberg (1960)	wild	NA	NA	10.0	14.5	0	2.52

Note: NA: not available.

Table 5. Standard metabolic rate (R_S in $mg \cdot h^{-1}$) for Atlantic salmon smolt of given fish origin and development stage, at given experimental approach and feeding regime, and in relation to body mass (M in g), water temperature (T in °C), and salinity (S).

Publication	Origin	Experimental setup	Feeding	M (g)	T (°C)	S	R_S ($mg \cdot h^{-1}$)
Baraduc and Fontaine (1955)	wild	NA	NA	49.0	7.4-8.3	0	4.75
Higgins (1985)	hatchery	flow-through	unfed, 48 h	6.96	7.5	0	0.14
Higgins (1985)	hatchery	flow-through	unfed, 48 h	8.53	7.5	0	0.21
Higgins (1985)	hatchery	flow-through	unfed, 48 h	18.73	7.5	0	0.32
Higgins (1985)	hatchery	flow-through	unfed, 48 h	18.64	7.5	0	0.49
Higgins (1985)	hatchery	flow-through	unfed, 48 h	16.79	7.5	0	0.52
Higgins (1985)	hatchery	flow-through	unfed, 48 h	28.61	7.5	0	0.96
Higgins (1985)	hatchery	flow-through	unfed, 48 h	26.37	7.5	0	1.06
Higgins (1985)	hatchery	flow-through	unfed, 48 h	66.41	7.5	0	2.88
Higgins (1985)	hatchery	flow-through	unfed, 48 h	44.14	7.5	0	2.60
Higgins (1985)	hatchery	flow-through	unfed, 48 h	27.53	7.5	0	1.73
Higgins (1985)	hatchery	flow-through	unfed, 48 h	26.56	7.5	0	1.77
Higgins (1985)	hatchery	flow-through	unfed, 48 h	8.20	7.5	0	0.26
Higgins (1985)	hatchery	flow-through	unfed, 48 h	8.14	7.5	0	0.24
Higgins (1985)	hatchery	flow-through	unfed, 48 h	7.56	7.5	0	0.22
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	5.85
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	9.48
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	9.51
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	9.13
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	9.05
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	9.32
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	9.46
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	9.39

Table 5 (Cont'd.)

Publication	Origin	Experimental setup	Feeding	M (g)	T (°C)	S	R_S ($mg \cdot h^{-1}$)
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	9.37
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	9.23
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	9.33
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	9.35
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	9.40
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	9.47
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	9.53
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	9.78
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	10.47
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	10.66
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	10.56
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	10.31
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	10.46
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	10.23
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	10.42
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	10.40
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	11.08
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	10.85
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	10.71
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	10.85
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	10.79
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	10.24
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	10.30
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	10.57
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	10.49
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	10.70
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	10.71
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	11.01

Table 5 (Cont'd.)

Publication	Origin	Experimental setup	Feeding	M (g)	T (°C)	S	R_S ($mg \cdot h^{-1}$)
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	11.01
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	10.73
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	10.72
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	10.48
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	10.60
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	10.63
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	10.70
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	10.73
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	10.80
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	10.40
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	10.11
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	9.56
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	9.75
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	13.3	0	9.50
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	6.20
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	10.01
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	9.85
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	9.56
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	9.47
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	9.91
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	9.85
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	9.64
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	9.54
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	9.69
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	9.62
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	9.61
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	9.62
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	10.01

Table 5 (Cont'd.)

Publication	Origin	Experimental setup	Feeding	M (g)	T (°C)	S	R_S ($mg \cdot h^{-1}$)
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	10.19
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	10.63
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	10.99
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	11.24
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	11.76
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	11.11
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	11.17
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	10.87
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	11.23
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	11.43
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	11.40
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	11.42
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	11.28
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	11.11
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	11.55
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	11.48
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	11.09
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	11.32
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	12.07
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	12.00
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	11.62
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	11.86
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	11.70
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	11.70
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	11.68
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	11.67
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	11.76
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	11.86

Table 5 (Cont'd)

Publication	Origin	Experimental setup	Feeding	M (g)	T (°C)	S	R_S ($mg \cdot h^{-1}$)
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	11.76
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	11.73
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	11.78
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	11.56
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	10.87
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	10.48
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	10.17
Maxime (2002)	hatchery	flow-through	unfed, 48 h	45.2	14.0	SW	10.02
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	7.83
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	14.70
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	14.27
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	14.14
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	13.76
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	13.96
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	13.85
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	13.60
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	13.91
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	13.73
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	13.59
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	13.18
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	13.38
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	15.24
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	15.58
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	16.93
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	17.38
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	17.60
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	17.33
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	17.45

Table 5 (Cont'd.)

Publication	Origin	Experimental setup	Feeding	M (g)	T (°C)	S	R_S ($mg \cdot h^{-1}$)
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	17.80
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	17.54
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	16.71
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	16.80
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	15.96
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	16.96
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	17.04
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	15.09
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	16.96
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	17.61
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	17.05
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	17.67
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	16.96
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	16.58
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	16.92
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	15.18
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	15.44
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	15.96
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	15.56
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	16.43
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	15.80
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	16.11
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	15.49
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	15.60
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	14.94
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	14.74
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	14.81
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	14.74

Table 5 (Cont'd.)

Publication	Origin	Experimental setup	Feeding	M (g)	T (°C)	S	R_S ($mg \cdot h^{-1}$)
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	14.18
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	14.45
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	14.8	0	14.69
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	8.88
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	14.95
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	15.02
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	14.83
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	14.72
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	14.80
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	14.50
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	14.97
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	14.71
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	14.40
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	14.48
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	14.74
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	14.73
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	14.83
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	15.25
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	15.96
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	15.02
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	15.80
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	14.43
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	14.37
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	14.30
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	14.74
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	15.72
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	15.15
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	13.77

Table 5 (Cont'd.)

Publication	Origin	Experimental setup	Feeding	M (g)	T (°C)	S	R_S ($mg \cdot h^{-1}$)
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	12.68
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	13.61
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	12.89
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	12.52
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	11.92
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	12.27
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	12.29
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	12.77
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	14.62
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	15.49
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	15.35
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	15.35
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	15.09
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	15.10
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	16.12
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	15.94
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	15.88
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	15.48
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	16.33
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	16.59
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	16.34
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	15.57
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	14.96
Maxime (2002)	hatchery	flow-through	unfed, 48 h	69.4	15.2	SW	14.91
Maxime et al. (1989)	hatchery	flow-through	unfed, 48 h	27.7	8.4	0	1.77
Maxime et al. (1989)	hatchery	flow-through	unfed, 48 h	43.6	12.5	0	4.04
Maxime et al. (1989)	hatchery	flow-through	unfed, 48 h	53.2	14.7	0	6.64
Maxime et al. (1989)	hatchery	flow-through	unfed, 48 h	117.4	18.6	0	13.15

Table 5 (Cont'd.)

Publication	Origin	Experimental setup	Feeding	M (g)	T (°C)	S	R_S ($mg \cdot h^{-1}$)
Power (1959)	wild	flow-through	unfed, 18 h	72.0	12.7	0	0.003
Power (1959)	wild	flow-through	unfed, 18 h	80.0	10.0	0	0.01
Power (1959)	wild	flow-through	unfed, 18 h	83.0	12.7	0	0.004
Power (1959)	wild	flow-through	unfed, 18 h	91.0	12.7	0	0.004
Whitey and Saunders (1973)	hatchery	NA	unfed, 36 h	194.2	15.0	35	16.64
Whitey and Saunders (1973)	hatchery	NA	unfed, 36 h	226.5	15.0	35	25.19

Note: NA: not available; SW: seawater, salinity not specified.

Table 6. Standard metabolic rate (R_S in $mg \cdot h^{-1}$) and routine metabolic rate (R_R in $mg \cdot h^{-1}$) for adult Atlantic salmon of given fish origin, at given experimental approach and feeding regime, and in relation to body mass (M in g), water temperature (T in °C), and salinity (S).

Publication	Origin	Experimental setup	Feeding	M (g)	T (°C)	S	R_S ($mg \cdot h^{-1}$)
Lucas et al. (1993)	hatchery	closed-system	unfed, 48 h	1979.0	11.0	SW	102.9
Lucas (1994)	hatchery	closed-system	unfed	542.5	4.0	SW	19.5
Lucas (1994)	hatchery	closed-system	unfed	1002.0	10	SW	72.9

Publication	Origin	Experimental setup	Feeding	M (g)	T (°C)	S	R_R ($mg \cdot h^{-1}$)
Fisk et al. (2002)	commercial fish farm	closed-system	unfed, 20 h	1050.0	17.0	SW	157.5
Kazakov and Khalyapina (1981)	wild	respirometer	NA	6149.5	NA	0	939.0
Kazakov and Khalyapina (1981)	wild	respirometer	NA	2549.5	NA	0	520.1
Kazakov and Khalyapina (1981)	wild	respirometer	NA	8849.5	NA	0	1006.2
Kazakov and Khalyapina (1981)	wild	respirometer	NA	2749.5	NA	0	501.0
Kazakov and Khalyapina (1981)	wild	respirometer	NA	7134.5	NA	0	642.8
Lucas (1994)	hatchery	closed-system	unfed	2045.0	4.0	SW	339.9
Lucas (1994)	hatchery	closed-system	unfed	2045.0	10.0	SW	346.0
Lucas (1994)	hatchery	closed-system	unfed	1804.0	4.0	SW	119.1
Lucas (1994)	hatchery	closed-system	unfed	1804.0	10.0	SW	158.8

Note: NA: not available; SW: seawater, salinity not specified.

Table 7. Routine metabolic rate (R_R in $mg \cdot h^{-1}$) for domesticated Atlantic salmon (Sunndalsøra salmon), at given life stage, experimental approach and feeding regime, and in relation to body mass (M in g), water temperature (T in °C), and salinity (S).

Publication	Life stage	Experimental setup	Feeding	M (g)	T (°C)	S	R_R ($mg \cdot h^{-1}$)
Bergheim et al. (1991)	parr	flow-through	fed	27.0	9	3-6	2.27
Bergheim et al. (1991)	parr	flow-through	fed	34.0	6.9	3-6	2.24
Bergheim et al. (1991)	parr	flow-through	fed	40.0	5	3-6	2.04
Bergheim et al. (1991)	parr	flow-through	fed	44.0	3.2	3-6	2.90
Bergheim et al. (1991)	parr	flow-through	fed	48.0	2.9	3-6	2.59
Bergheim et al. (1991)	parr	flow-through	fed	52.0	3.3	3-6	2.34
Bergheim et al. (1991)	parr	flow-through	fed	60.0	5.2-6.7	3-6	5.04
Bergheim et al. (1991)	smolt	flow-through	fed	67.0	10.2-12	3-6	11.66
Bergheim et al. (1991)	adult	flow-through	fed	410.0	12.7	27-32	49.20
Bergheim et al. (1991)	adult	flow-through	fed	1018.0	7.2	27-32	109.94
Bergheim et al. (1991)	adult	flow-through	fed	1335.0	6.8	27-32	168.21
Bergheim et al. (1991)	adult	flow-through	fed	1530.0	7.5	27-32	192.78
Bergheim et al. (1991)	adult	flow-through	fed	1832.0	6.8	27-32	340.75
Bergheim et al. (1991)	adult	flow-through	fed	2100.0	7.5	27-32	390.60

Table 8. Standard metabolic rate (R_S in $mg \cdot h^{-1}$) and routine metabolic rate (R_R in $mg \cdot h^{-1}$) for growth enhanced transgenic Atlantic salmon, at given life stage, experimental approach and feeding regime, and in relation to body mass (M in g), water temperature (T in °C), and salinity (S).

Publication	Life stage	Experimental setup	Feeding	M (g)	T (°C)	S	R_S ($mg \cdot h^{-1}$)
Stevens et al. (1998)	parr	flow-through	unfed, 12 h	8.4	12.5	4	1.63

Publication	Life stage	Experimental setup	Feeding	M (g)	T (°C)	S	R_R ($mg \cdot h^{-1}$)
Cook et al. (2000)	parr	flow-through	unfed, 24 h	14.0	13.0	0	3.94
Cook et al. (2000)	parr	flow-through	unfed, 24 h	52.0	13.0	0	15.82
Stevens et al. (1998)	parr	flow-through	unfed, 12 h	40.8	12.2	4	10.84
Stevens et al. (1998)	parr	flow-through	fed	23.0	12.2	4	8.62
Stevens et al. (1998)	parr	flow-through	fed	23.0	12.5	4	16.11
Stevens et al. (1998)	parr	flow-through	fed	23.0	12.5	4	16.12
Stevens et al. (1998)	parr	flow-through	fed	23.0	12.5	4	15.78
Stevens et al. (1998)	parr	flow-through	fed	23.0	12.5	4	15.85
Stevens et al. (1998)	parr	flow-through	fed	23.0	12.5	4	16.97
Stevens et al. (1998)	parr	flow-through	fed	23.0	12.5	4	16.91
Stevens et al. (1998)	parr	flow-through	fed	23.0	12.5	4	15.99
Stevens et al. (1998)	parr	flow-through	fed	23.0	12.5	4	15.96
Stevens et al. (1998)	parr	flow-through	fed	23.0	12.5	4	15.06
Stevens et al. (1998)	parr	flow-through	fed	23.0	12.5	4	15.02
Stevens et al. (1998)	parr	flow-through	fed	23.0	12.5	4	14.13
Stevens et al. (1998)	parr	flow-through	fed	23.0	12.5	4	14.13
Stevens et al. (1998)	parr	flow-through	fed	23.0	12.5	4	13.81
Stevens et al. (1998)	parr	flow-through	fed	23.0	12.5	4	13.75

Table 8 (Cont'd.)

Publication	Life stage	Experimental setup	Feeding	M (g)	T (°C)	S	R_R ($mg \cdot h^{-1}$)
Stevens et al. (1998)	parr	flow-through	fed	23.0	12.5	4	15.30
Stevens et al. (1998)	parr	flow-through	fed	23.0	12.5	4	15.24
Stevens et al. (1998)	parr	flow-through	fed	23.0	12.5	4	15.56
Stevens et al. (1998)	parr	flow-through	fed	23.0	12.5	4	15.61
Stevens et al. (1998)	parr	flow-through	fed	23.0	12.5	4	14.99
Stevens et al. (1998)	parr	flow-through	fed	23.0	12.5	4	15.02
Stevens et al. (1998)	parr	flow-through	fed	23.0	12.5	4	16.49
Stevens et al. (1998)	parr	flow-through	fed	23.0	12.5	4	16.51
Stevens et al. (1998)	parr	flow-through	fed	23.0	12.5	4	15.77
Stevens et al. (1998)	parr	flow-through	fed	23.0	12.5	4	15.75
Stevens et al. (1998)	parr	flow-through	fed	23.0	12.5	4	16.57
Stevens et al. (1998)	parr	flow-through	fed	23.0	12.5	4	16.57
Stevens et al. (1998)	parr	flow-through	fed	23.0	12.5	4	16.02
Stevens et al. (1998)	parr	flow-through	fed	23.0	12.5	4	16.04
Stevens et al. (1998)	parr	flow-through	fed	23.0	12.5	4	14.63
Stevens et al. (1998)	parr	flow-through	fed	23.0	12.5	4	14.61

Table 9. Summary of body mass (g), water temperature (°C), and salinity ranges used in extracted data of standard metabolic rate (R_s in $mg \cdot h^{-1}$) and routine metabolic rate (R_R in $mg \cdot h^{-1}$) for different life stages of Atlantic salmon.

	fry	parr	smolt	adult
Body mass (g)				
Minimum	0.1	1.9	6.96	410.0
Maximum	7.6	67.5	226.5	8849.5
Temperature (°C)				
Minimum	3.0	1.0	7.4	4.0
Maximum	22.0	22.0	18.6	17.0
Salinity				
Minimum	0	0	0	0
Maximum	0	SW	SW	SW
R_s ($mg \cdot h^{-1}$)				
Minimum	0.01	0.004	0.003	19.45
Maximum	1.37	9.07	25.19	102.91
R_R ($mg \cdot h^{-1}$)				
Minimum	0.04	1.53	-	49.20
Maximum	1.30	16.97	-	1006.19

Note: SW: seawater, salinity not specified.